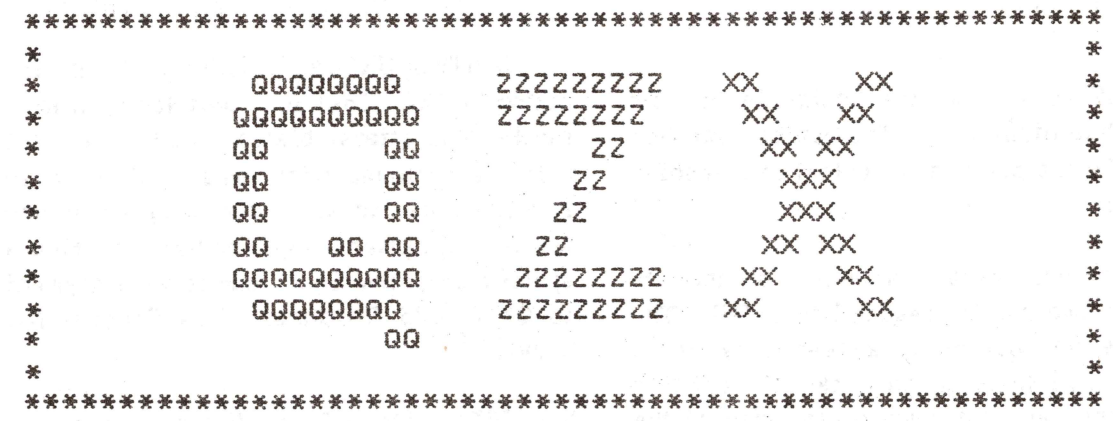


The Journal Covering Amateur Radio & Sinclair Computers
ZX80; Micro-Ace; ZX81; TS1000, 1500, & 2068; QL; Z88

Alex. F. Burr, K5XY, Publisher
2025 O'Donnell Drive
Las Cruces, New Mexico
88001

Volume 8 Number 2 ($1.50 / issue) 1990 January

* EDITOR'S NOTES K5XY
* UNCLASSIFIED ADS
* MONSTER TS1000 LU8MAD
* EXPLORING THE TS1000 SINCLAIR LOGIC CHIP (SCL) III DON LAMEN

EDITOR'S NOTES

K5XY

WA4BQE wrote that the Louisville Sinclair group had disbanded. That is too bad because Ed has put a lot of effort into keeping it alive.

At least one reader commented on the efforts to improve the readability of QZX. The next issue will bring a few more small changes. I hope to go back to indenting paragraphs and cut down on the size of the space between them. I also may experiment with the space between sentences.

A little computer news. It has been reported that the US distributor for the Z88 (Cambridge NA) is filing for bankrupcy. The report also stated that Sharp's would continue to sell that computer, getting their supplies directly from Great Britain. It has also been rumored that Cambridge (from Great Britain and the name of Sinclair's company) is coming out with a new laptop which includes a small disk drive. I have no information on prices, but you can be sure that it will be significantly more expensive than the Z88.

Shortly before this issue was mailed, I left for Chicago to teach in a short course for the International Atomic Energy Agency. While there, I hope to attend a meeting of the Chicago Area Timex Users Group, one of the more active groups still operating.

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

WANTED: Mterm/T (or Mterm I) program; also dialing routine; and schematic diagram of Tarp PSK modem or similar. Contact me, Guillermo Garcia (LU8MAD), Cabildo 584, V. Nueva, Mendoza, ARGENTINA.

QZX Discount: 15% discount on all orders mentioning QZX. T & C Services (address in ad in this issue).

WANTED: Tasman Interface Parallel Printer Driver and software. Schematic drawing if available. Edward L. Radtke, 1602 Woodluck Ave., Louisville, KY 40205.

DAFYNITION

PROGRAM n. A magic spell cast over a computer allowing it to turn one's input into error messages.

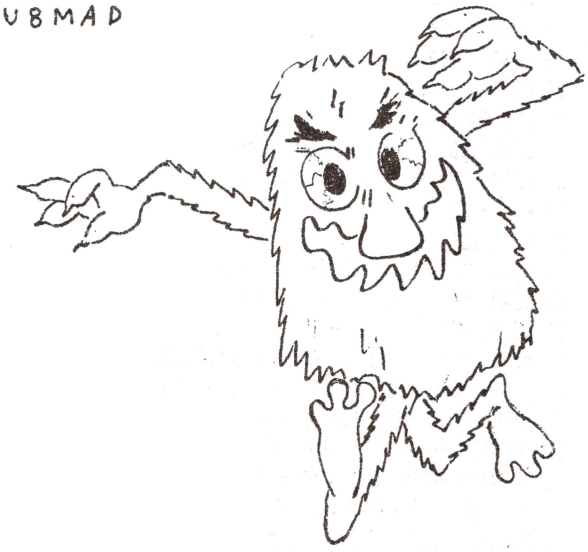
tr. v. To engage in a pastime similar to banging one's head against a wall, but with fewer opportiunities for reward.

(716) 834-1716 T & C SERVICES 20 LIBERTY TERRACE BUFFALO, N.Y. 14215 (716) 834-1716

Call or write for a free catalog of products for the Timex Computer

I HAVE CREATE A MONSTER!..

LUBMAD



THIS MONSTER THAT I HAVE NAMED PROVISIONALLY HANmouth sinclae, BILL. (HANDLE "LITTLE MONSTER") IS THE RESULT OF SEVEN YEARS OF WORK !

WHAT ?

DO YOU NOT UNDERSTAND ?

YES, I HAVE MAKE A MONSTER, HE IS NOT OF GREEN COLOUR OR TERRIF, BUT ALIVE!

IS THE MAIN COMPUTER OF MY HAM SHACK, THAT I HAVE DONE DURING THE PAST YEARS AND NOW I PRESENT TO QZX READERS COMMUNITY.

WHY MONSTER? READ THE FOLLOWINGS PARAGRAFH AND YOU SEE!..

ANATOMY

MONSTER BODY: ENCLOSED INTO A METAL CABINET OR CONSOLE TO AVOID RFI I HAVE SET ABUNDANT GOODIES.

THIS CABINET (SEE Fig 1) MEASURES 45 X 26 X 10 CENTIMETERS MADE WITH METAL SHEET, PAINTED OF WHITE COLOUR, WITH APPROPRIATE NOTCH FOR KEYBOARD.

MONSTER INNER PARTS: IT IS THE REASON TO QUALIFY THIS ENTITY A MONSTER:

- 1 BIG KEYBOARD, MADE BY G.I. FOR TEXAS TI99/4A
- 7 MAINS PRINTED CIRCUIT BOARDS, PLUS 9 SECONDARIES.
- 95 INTEGRATED CIRCUITS (COMPUTED 22 IC'S OF 64K MEMOPACK):

THE MAINS IC's ARE Z80A CPU, ULA, 8K ROM (ALL FROM TS1000), INS8250 UART, 8251A USART, 8255A PI, TWO TMS27C128 (8 X 16K) EPROMS , HM6264LP-15 (8K) STATIC RAM, MSM5832 REAL TIME/CALENDAR CHIP, MC1408L8 DAC, AND LOTS OF REGULATORS, COMPARATORS, TIMERS, OPERATIONALS AMPLIFIERS, OPTO COUPLERS, INVERTERS, GATES (OR, AND, NOR, NAND), TTL & CMOS.

- 14 TRANSISTORS
- SEVERAL DIODES, LEDS, ZENER, ETC.
- 2 POWER TRANSFORMERS
- 2 CRISTALS
- 1 FAN, MOUNTED FOR EXHAUST
- 12 SWITCHES
- 5 DIM CONNECTORS
- 2 RCA CONNECTORS
- 1 CENTRONICS CONNECTOR
- 1 PUSH BUTTON SWITCH FOR RESET

MONSTER CEREBRUM:

IT's FORMED BY 32K OF EPROM, 8K OF STATIC RAM, 64K OF DYNAMIC RAM AND 8K OF ROM.

THE FIRMWARE IS ADDRESED IN FOUR 8K BANK's: A, B, C, D. THIS BANK's ARE SELECTED BY APPROPRIATE SWITCHES IN FRONT PANEL.

I HAVE SET IN 24K OF EPROM (BANKS B,C,D) THE MORE USEFUL SOFTWRE OF TS1000 FOR HAM's THE CLASSIC: CWSS & NRAP FROM CLIFF (NU4V) FOR CW AND RTTY-ASCII. ZX-TERM*80 TERMINAL PROGRAM (F.NACHBAUR) FOR PACKET AND TS2050 (TELEPHONE MODEM) WITH 40, 60 & 80 CHARACTERS PER LINE !

ALSO QUASI HI-RESOLUTION (256 X 192) ROUTINE, BY COMPUTER RENTALS Ltd.

INTO REMAINDER 8K OF EPROM I HAVE PUT SOME VERY USEFUL ROUTINES.

ROUTINES 1 TO 6 OF LIST BELOW ARE FROM FIRMWARE OF MICRODIGITAL TK-85 (TS1000 CLONE) IS THE MORE EFFICIENT PROGRAM THAT I HAVE SEEN. THIS IS MORE SUPERB THAT QUICLOAD, Z-XLR8, QSAVE AND FASTLOAD.

SOME OTHER ROUTINES ARE COLLECTION OF GOODIES FROM SEVERAL AUTHORS, PUBLISHED IN DIVERSITY OF MAGAZINES.

A FEW ROUTINES ARE MINE (PUBLISHED IN QZX)

ROUTINES:

1 SAVE (HI SPEED)
2 LOAD (HI SPEED)
3 VERIFY (HI SPEED)
4 DATA SAVE (HI SPEED)
5 DATA LOAD (HI SPEED)
6 DATA VERIFY (HI SPEED)
7 SAVE (DUMP) PROG. INTO STATIC RAM
8 LOAD (DUMP) PROG. INTO STATIC RAM
9 MEMO FREE
10 ADDRESS OF BASIC LINE #
11 READ
12 DATA
13 RESTORE

14 DEC TO HEX
15 HEX TO DEC
16 ANTISCROLL
17 SCROLL LEFT
18 SCROLL RIGHT
19 DELETE LINE #
20 CLS PARTIAL
21 STORE (DISPLAY FILE) IN SRAM
22 RECALL (DISPLAY FILE) FROM SRAM
23 FLASHING
24 RENUMBER
25 SAVE VARIABLES ONLY (TO TAPE)
26 LOAD VARIABLES ONLY(FROM TAPE)
27 DELAY (FF FF)
28 MERGE I & II (ALLOW APPEND TWO PRG.)
29 GENERATOR OF 1 REM (500 SPARE BYTES)
30 VIDEO INVERTER ROUTINE
31 PRINTER PATCH (FOR STRING)
32 PRINTER PATCH (FOR LISTING)
33 PRINTER PATCH (FOR COPY)
34 ROTATOR CONTROLER ROUTINE
35 C.A.T CONTROL TRANSCEIVER
36 PAUSE 100 SUBROUTINE
37 PAUSE 4E4 SUBROUTINE
REAL TIME CLOCK ROUTINE (CLK1000)
39 DUMPER EPROM TO STATIC RAM

IN STATIC RAM (8 BIT X 8K) ARE COPIED THE ROUTINES OR PROGRAMS FROM EPROM BANKS WHEN POKES AND TRANSFERENCE OF DATA IS NEED . AN APPROPRIATE RAND USR DUMP THE SOFTWARE.
THIS SRAM IS ALSO USED BY ZX-TERM*80 FOR HIS HI RESOLUTION DISLAY FILE AND TABLES.

EXTREMITIES (BRIEF DESCRIPTION)

(A) ONLY ONBOARD CONFIGURATION, WITHOUT EXTERNAL DEVICES.

ONE SERIAL PORT RS232
ONE SERIAL PORT TTL
ONE PARALLEL (CENTRONICS) PORT
ONE AD-DA PORT
OUTPUT VIDEO TO TV-SET
OUTPUT VIDEO TO MONITOR
VIDEO INVERTER
BATTERY CHARGER (FOR Ni Cad BAT)
BEEPER, FOR (BAUDOT CODE) BELL DETECTION, AND KEY DEPRESSED USR & FUNCTION.

(B) WITH EXTERNAL DEVICE, ALL SAME AS (A) PLUS:

[B1] TS2050 MODIFIED
SERIAL PORT RS232
TELEPHONE PORT
[B2] SERIAL/PARALLEL INTERFACE
ONE SERIAL PORT RS232
ONE SERIAL PORT TTL
ONE PARALLEL I/O PORT
ONE DA/AD PORT

PHYSIOLOGY (OR HIS FUNCTIONS)

TRANSCEIVER RTTY (ALL SPEED AN SHIFT), ASCII, CW, WITH REAL TIME BIG PRINTER OPTION

TERMINAL (MULTIPLE SPEED) FOR PACKET AND TS2050

ROTATOR CONTROLLER

CAT FOR YAESU FT757GX

BIG-PRINTER DRIVER (WITH WORD PROCESSOR)

ALL SOFTWARE IN FIRMWARE, AND OF COURSE, ALL CAPABILITY OF ANY TS1000 WITH 64K OF RAM...!

"LITTLE MONSTER" IS GRAND-SON OF "OLDBOY sapiens", A ZX81 WITH ALL MEMOTECH (HI RESOLUTION GRAHC, MEMOTEX, RS232 IF, MEMOCALC, 64K MEMOPACK, BIGKEYBOARD AND IF) PLUS HOMEBRED PARALLEL PORT AND TALKER BASED ON SP0256 IC "NARRATOR SPEECH PROCESSOR", ALL ENCLOSED INTO A WOOD CABINET, BUT UNFORTUNATELY HE HAVE BEEN NOT FRIENDLY WITH RADIO AMATEURS....

FOR ME,"LITLLE MONSTER" IS THE MORE USEFUL PART OF HAM SHAK MINE, AFTER MY ANTENNA !...

WELL, I SHALL GIVE NOW SOME PEA-NUTS TO MY "LITTLE MONSTER"...

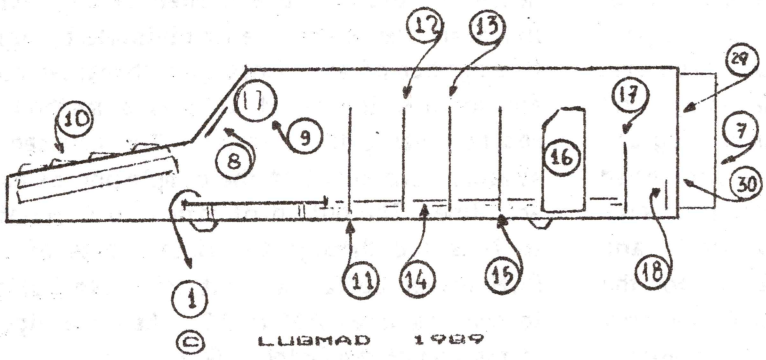
73, LU8MAD GUILLERMO (BILL)

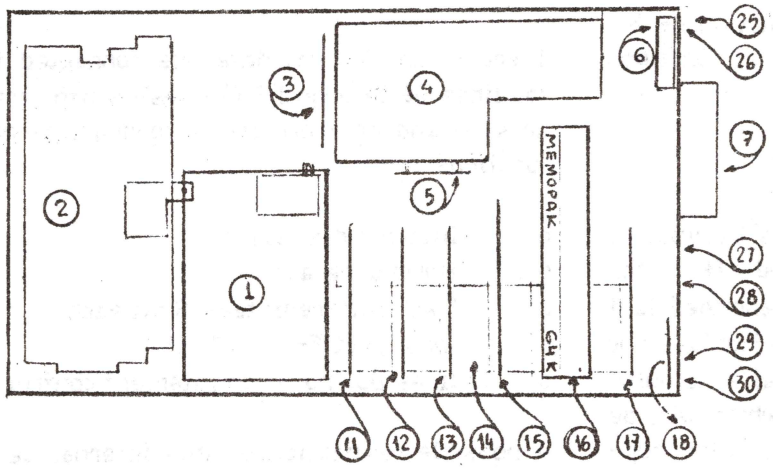
REFERENCES

CABINET PLANS	QZX JANUARY 1989
KEYBOARD	QZX APR 1986, SEP 1988
TURN OR NOT TURN	QZX OCTOBER 1987
2 X 1	QZX JUNE 1985
(1000)232-2ED	QZX MARCH 1986
PARALLEL IF	QZX OCTOBER 1988
BEEPER	QZX SEPTEMBER 1988
CLK 1000	QZX JUL & DEC 1987
RAM's RESCUE	QZX SEPTEMBER 1988

TS1000 BASED COMPUTER

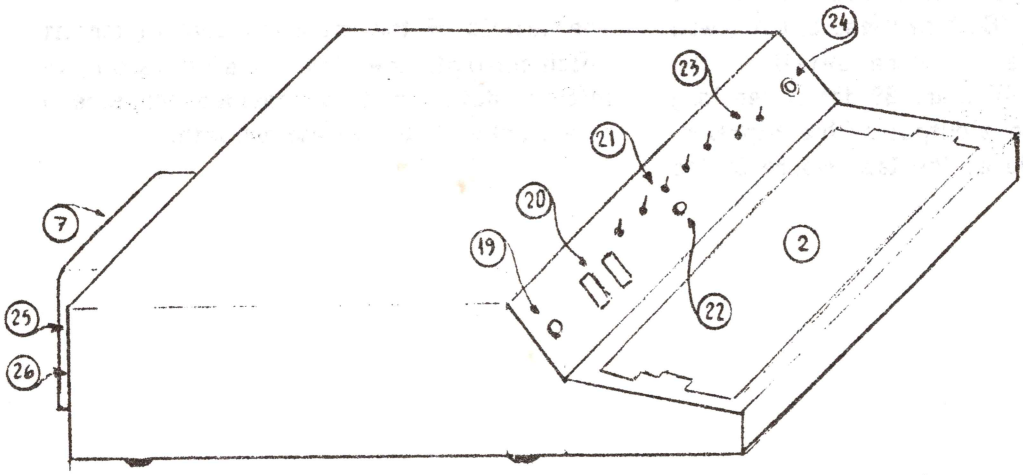
FULLY DEDICATED TO AMATEUR RADIO





REFERENCES

1 TS1000 BOARD
2 KEYBOARD NOTCH
3 VIDEO INVERTER
4 POWER SUPPLIERS
5 BATTERY CHARGER
6 NICD BATTERIES
7 FAN (BRUSHLESS) 12V CC
8 EXTRA KEYS DECODER BOARD
09 SPEAKER FOR BEEPER
10 TI KEYBOARD
11 CLK1000 (CLOCK/CALENDAR)
12 EPROMS BOARD
13 2 X 1 (CW/RTTY) BOARD
14 CONNECTION SYSTEM / ADD-ONS
15 ROTATOR AND CAT INTERFACE
16 MEMOPACK 64K MODULE
17 PARALLEL IF BOARD
18 555 OSCILATORS BOARD
19 ON/OFF LED
20 POWER & FAN SWITCHES
21 BANKS A,B,C,D SWITCHES
22 CW TUNING LED
23 VIDEO SELECTION SWITCHES
24 RESET BUTTON SWITCH
25 TV-SET CONNECTOR
26 MONITOR CONNECTOR
27 ROTATOR CONTR. CONNECTOR
28 CENTRONICS CONNECTOR
29 USART FREQUENCIES SWITCHES
30 SERIAL(RS232 & TTL) CONNEC.



EXPLORING THE TS1000 SINCLAIR LOGIC CHIP (SCL) IV

Don Lamen

This article is a continuation of the series which began in the October issue of QZX. The purpose is to explain the function of the SCL logic chip in the ZX and TS1000 series of Sinclair computers. This chip is a custom chip designed particularly for our computers. The previous articles gave some background on the chip, provided a functional diagram, and listed 17 separate functions performed by the chip. These and succeeding articles discuss these functions individually and provide an equivalent circuit diagram for the function. These circuit diagrams are only the equivalent of the actual circuits inside the chip because nothing is known about the real connections inside, but the circuits given here will perform the function of the real circuit. For a list of these 17 functions see the October issue of QZX.

HORIZONTAL SYNC GENERATOR

The horizontal sync generator is basically a flip-flop which is turned on and off by the main timing chain (which was described last month). The output of the horizontal sync generator supplies the horizontal sync pulse to the video combiner circuit (which will be discussed in a future issue). It also supplies the source signal for the NMI generator and one of the control signals for the intercept circuit. (Both of these circuits will also be discussed in more detail in the future.) These pulses are 38 dot cycles long and come from the Q output of the flip-flop. See the right side of the last figure in the October issue.

CHARACTER SCAN LINE COUNTER

The character scan line counter is a 3 bit binary counter. (A 4 bit counter is shown in the simulation, but only the first 3 bits are used.) This counter is reset by a reset signal which is generated by the frame sync generator and is held in the reset mode until the end of the frame sync pulse. This is necessary because the number of dot cycles in a scan line is not evenly divisible by eight (the number of scan lines in a character row) and holding the reset affords a method or resyncronizing the counter. The counter is advanced one count at the completion of each scan line. The output of bits 1 to 3 (count 0 to 7) is fed through the first 3 bits of the ROM driver buffer (a 9 bit tri-state buffer) to address lines A0' to A2'. See the figure at the end of the October QZX.

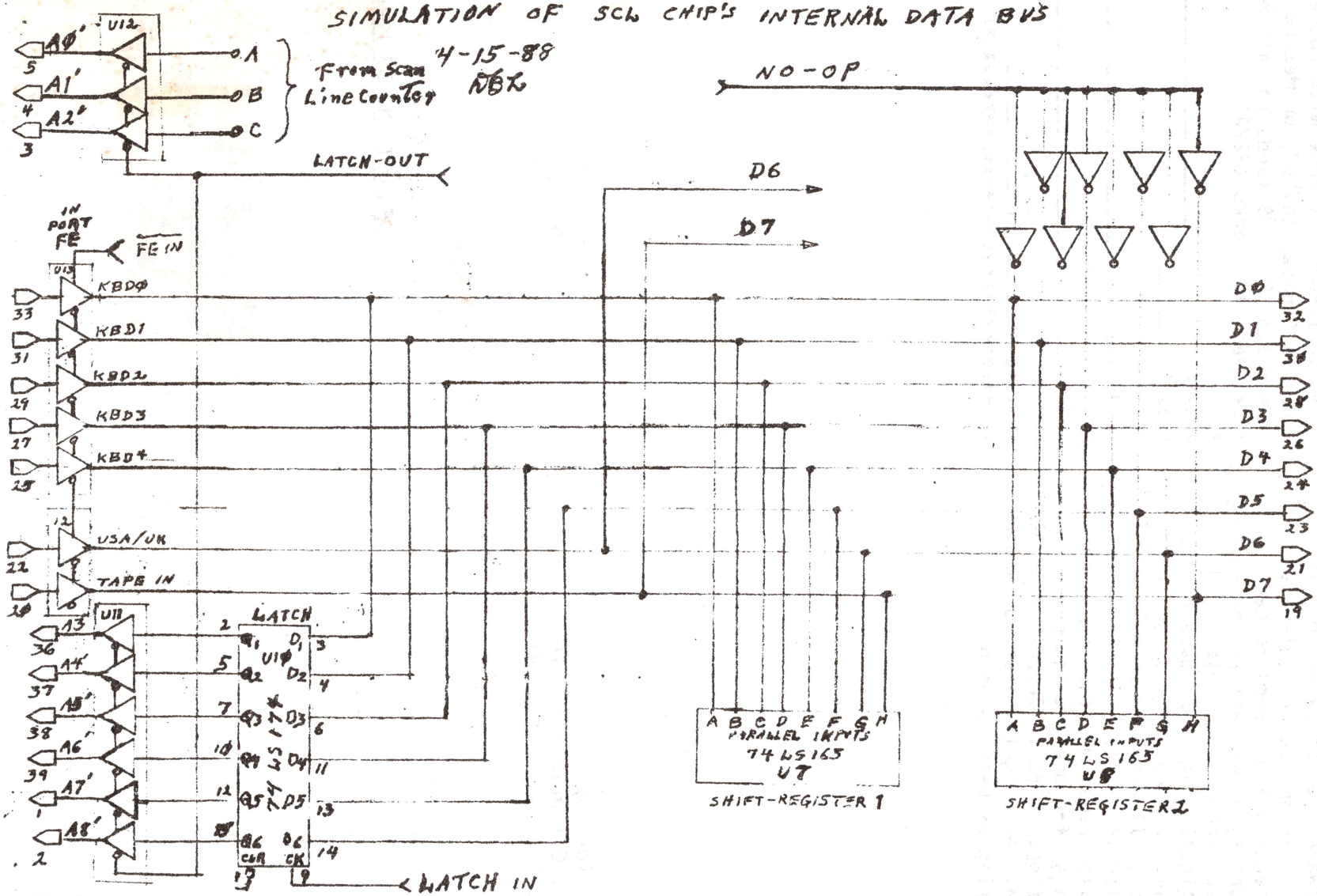
INTERNAL DATA BUS

There is an internal data bus connected to the lines D0 through D7 (8 lines), which carry data to and or from the following internal functions.

- internal data latch
- NoOp generator
- Two shift-registers 8 bit each
- input port FE 7 bit
- lines D6 and D7 to intercept control

A possible realization of this internal data bus is shown on the next page.

The details of the intercept control circuit which controls the flow of signals on the internal data bus (and provides for screen inversion) will be given next month.



DZX 1998 JANUARY

73, K5XY

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